

# SEQUENCE LISTING

<110> RHODES, Simon J.  
BRIDWELL, Jeanne L.  
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SLOOP, Kyle W.

<120> GENERATION OF DIAGNOSTIC TOOLS TO ASSAY THE HUMAN  
LHX3/P-LIM/LIM-3 FACTOR

<130> 053884-5003

<140> NOT YET ASSIGNED

<141> 2001-08-17

<150> PCT/US00/04424

<151> 2000-02-22

<150> US 60/121,110

<151> 1999-02-22

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<170> PatentIn Ver. 2.1

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 Val Ser Phe Thr Asp Glu Pro Ser Met Ala Asp Met Gly Pro Ala Asn  
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 Pro Glu Gln Tyr Arg Glu Leu Arg Pro Gly Ser Pro Tyr Gly Ile Pro  
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Lys Arg Phe Gly Thr Lys Cys Ala Ala Cys Gln Gln Gly Ile Pro Pro  
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Pro Lys Pro Ala Arg His Val Arg Glu Gln Leu Ser Ser Glu Thr Gly  
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<213> Homo sapiens

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gcggctcggg gctgctgggg ttcccgagga agtggggcca gggcgtaag ggagggtgg 1440
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<210> 12

<211> 402

<212> PRT

<213> Homo sapiens

<400> 12

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Met Glu Ala Arg Gly Glu Leu Gly Pro Ala Arg Glu Ser Ala Gly Gly
  1              5              10              15

```

```

Asp Leu Leu Leu Ala Leu Leu Ala Arg Arg Ala Asp Leu Arg Arg Glu
      20              25              30

```

```

Ile Pro Leu Cys Ala Gly Cys Asp Gln His Ile Leu Asp Arg Phe Ile
    35              40              45

```

```

Leu Lys Ala Leu Asp Arg His Trp His Ser Lys Cys Leu Lys Cys Ser
    50              55              60

```

```

Asp Cys His Thr Pro Leu Ala Glu Arg Cys Phe Ser Arg Gly Glu Ser
    65              70              75              80

```

```

Val Tyr Cys Lys Asp Asp Phe Phe Lys Arg Phe Gly Thr Lys Cys Ala
    85              90              95

```

```

Ala Cys Gln Leu Gly Ile Pro Pro Thr Gln Val Val Arg Arg Ala Gln
   100              105              110

```

```

Asp Phe Val Tyr His Leu His Cys Phe Ala Cys Val Val Cys Lys Arg
   115              120              125

```

```

Gln Leu Ala Thr Gly Asp Glu Phe Tyr Leu Met Glu Asp Ser Arg Leu
   130              135              140

```

Val Cys Lys Ala Asp Tyr Glu Thr Ala Lys Gln Arg Glu Ala Glu Ala  
 145 150 155 160  
 Thr Ala Lys Arg Pro Arg Thr Thr Ile Thr Ala Lys Gln Leu Glu Thr  
 165 170 175  
 Leu Lys Ser Ala Tyr Asn Thr Ser Pro Lys Pro Ala Arg His Val Arg  
 180 185 190  
 Glu Gln Leu Ser Ser Glu Thr Gly Leu Asp Met Arg Val Val Gln Val  
 195 200 205  
 Trp Phe Gln Asn Arg Arg Ala Lys Glu Lys Arg Leu Lys Lys Asp Ala  
 210 215 220  
 Gly Arg Gln Arg Trp Gly Gln Tyr Phe Arg Asn Met Lys Arg Ser Arg  
 225 230 235 240  
 Gly Gly Ser Lys Ser Asp Lys Asp Ser Val Gln Glu Gly Gln Asp Ser  
 245 250 255  
 Asp Ala Glu Val Ser Phe Pro Asp Glu Pro Ser Leu Ala Glu Met Gly  
 260 265 270  
 Pro Ala Asn Gly Leu Tyr Gly Ser Leu Gly Glu Pro Thr Gln Ala Leu  
 275 280 285  
 Gly Arg Pro Ser Gly Ala Leu Gly Asn Phe Ser Leu Glu His Gly Gly  
 290 295 300  
 Leu Ala Gly Pro Glu Gln Tyr Arg Glu Leu Arg Pro Gly Ser Pro Tyr  
 305 310 315 320  
 Gly Val Pro Pro Ser Pro Ala Ala Pro Gln Ser Leu Pro Gly Pro Gln  
 325 330 335  
 Pro Leu Leu Ser Ser Leu Val Tyr Pro Asp Thr Ser Leu Gly Leu Val  
 340 345 350  
 Pro Ser Gly Ala Pro Gly Gly Pro Pro Pro Met Arg Val Leu Ala Gly  
 355 360 365  
 Asn Gly Pro Ser Ser Asp Leu Ser Thr Gly Ser Ser Gly Gly Tyr Pro  
 370 375 380  
 Asp Phe Pro Ala Ser Pro Ala Ser Trp Leu Asp Glu Val Asp His Ala  
 385 390 395 400  
 Gln Phe

<210> 13  
 <211> 1658  
 <212> DNA  
 <213> Sus scrofa

<400> 13

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atcctggacc gcttcacct caaggctctg gaccgccact ggacagcaa gtgcctcaag 180
tgcaaggacg acttcttcaa gcgcttcggg accaagtgcg ccgctgcca gctgggcac 300
ccgcccacgc aggtgggtgcg ccgcgcccag gacttcgtgt accacctgca ctgcttcgcc 360
tgctcgtgt gcaagcgga gctggccacg ggcgacgagt tctacctcat ggaggacagc 420
cggctcgtgt gcaagggcga ctacgagacc gccaagcagc gagaggccga ggccacggcc 480
aagcggccgc gcacgaccat cacggccaag cagctggaga cgctgaagag cgctacaac 540
acgtcgccca agcccgcgc ccacgtgcgc gagcagctct cctccgagac cggcctggac 600
atgcgcgtg tgcaagggtg gtccagaac cgccgggcca aggaaaagcg gctcaagaag 660
gacgcggcc ggacgcgtg ggccagtag tttcgtaaca tgaagcgcg ccgcgggtgg 720
tccaagtgcg acaaggacag cgtccaggag gaggggcagg acagtgcgc cgaggtctcc 780
ttcacagacg agccatccat ggccgaaatg ggccctgcca acggcctcta cggcggcctg 840
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cagcacagcc ctcagactgg aagatgcttt aatttttaaa attaaaaaat aatacgaact 1620
gtgcttccat ttcccagctt cctctgtcta gttctgcc 1658
```

<210> 14

<211> 401

<212> PRT

<213> *Sus scrofa*

<400> 14

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Met Leu Leu Glu Thr Glu Leu Ala Gly Asp Arg Asp Arg Pro Gly Ala
  1                      5                      10                      15

Pro Ala Ala Ala Val Cys Thr Leu Pro Gly Thr Arg Glu Ile Pro
          20                      25                      30

Leu Cys Ala Gly Cys Asp Gln His Ile Leu Asp Arg Phe Ile Leu Lys
          35                      40                      45

Ala Leu Asp Arg His Trp His Ser Lys Cys Leu Lys Cys Ser Asp Cys
          50                      55                      60

His Thr Pro Leu Ala Glu Arg Cys Phe Ser Arg Gly Glu Ser Leu Tyr
          65                      70                      75                      80

Cys Lys Asp Asp Phe Phe Lys Arg Phe Gly Thr Lys Cys Ala Ala Cys
          85                      90                      95

Gln Leu Gly Ile Pro Pro Thr Gln Val Val Arg Arg Ala Gln Asp Phe
          100                      105                      110
```

Val Tyr His Leu His Cys Phe Ala Cys Val Val Cys Lys Arg Gln Leu  
 115 120 125  
 Ala Thr Gly Asp Glu Phe Tyr Leu Met Glu Asp Ser Arg Leu Val Cys  
 130 135 140  
 Lys Ala Asp Tyr Glu Thr Ala Lys Gln Arg Glu Ala Glu Ala Thr Ala  
 145 150 155 160  
 Lys Arg Pro Arg Thr Thr Ile Thr Ala Lys Gln Leu Glu Thr Leu Lys  
 165 170 175  
 Ser Ala Tyr Asn Thr Ser Pro Lys Pro Ala Arg His Val Arg Glu Gln  
 180 185 190  
 Leu Ser Ser Glu Thr Gly Leu Asp Met Arg Val Val Gln Val Trp Phe  
 195 200 205  
 Gln Asn Arg Arg Ala Lys Glu Lys Arg Leu Lys Lys Asp Ala Gly Arg  
 210 215 220  
 Gln Arg Trp Gly Gln Tyr Phe Arg Asn Met Lys Arg Ala Arg Gly Gly  
 225 230 235 240  
 Ser Lys Ser Asp Lys Asp Ser Val Gln Glu Glu Gly Gln Asp Ser Asp  
 245 250 255  
 Ala Glu Val Ser Phe Thr Asp Glu Pro Ser Met Ala Glu Met Gly Pro  
 260 265 270  
 Ala Asn Gly Leu Tyr Gly Gly Leu Gly Glu Pro Ala Pro Ala Leu Gly  
 275 280 285  
 Arg Pro Ser Gly Ala Pro Gly Ser Phe Pro Leu Glu His Gly Gly Leu  
 290 295 300  
 Ala Gly Pro Glu Gln Tyr Gly Glu Leu Arg Pro Ser Ser Pro Tyr Gly  
 305 310 315 320  
 Val Pro Ser Ser Pro Ala Ala Leu Gln Ser Leu Pro Gly Pro Gln Pro  
 325 330 335  
 Leu Leu Ser Ser Leu Val Tyr Pro Glu Ala Gly Leu Gly Leu Val Pro  
 340 345 350  
 Ala Gly Pro Pro Gly Gly Pro Pro Pro Met Arg Val Leu Ala Gly Asn  
 355 360 365  
 Gly Pro Ser Ser Asp Leu Ser Thr Gly Ser Ser Gly Gly Tyr Pro Asp  
 370 375 380  
 Phe Pro Ala Ser Pro Ala Ser Trp Leu Asp Glu Val Asp His Ala Gln  
 385 390 395 400  
 Phe

<210> 15  
 <211> 1664  
 <212> DNA  
 <213> Sus scrofa

<400> 15  
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 cagcacatcc tggaccgctt catcctcaag gctctggacc gccactggca cagcaagtgc 180  
 ctcaagtgca gtgactgcca cagcccgctg gccgagcgct gcttcagccg cggagagagc 240  
 ctctactgca aggacgactt cttcaagcgc ttcgggacca agtgcgccgc gtgccagctg 300  
 ggcattccgc ccacgcaggt ggtgcgcgcg gcccaggact tcgtgtacca cctgcactgc 360  
 ttcgcctgcy tcgtgtgcaa gcggcagctg gccacgggcy acgagttcta cctcatggag 420  
 gacagccggc tcgtgtgcaa ggcgcactac gagaccgcca agcagcgaga ggccgaggcc 480  
 acggccaagc ggccgcgcac gaccatcacg gccaaagcagc tggagacgct gaagagcgcc 540  
 tacaacacgt cgcccaagcc cgcgcgccac gtgcgcgagc agctctcttc cgagaccggc 600  
 ctggacatgc gcgtcgtgca ggtgtggttc cagaaccgcc gggccaagga aaagcggctc 660  
 aagaaggacg ccggccggca gcgctggggc cagtactttc gtaacatgaa gcgcgcccgc 720  
 ggtggctcca agtcggacaa ggacagcgtc caggaggagg ggcaggacag tgacgccgag 780  
 gtctccttca cagacgagcc atccatggcc gaaatgggcy ctgccaacgg cctctacggc 840  
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 ctggagcacg gaggcctggc gggcccggag cagtatggag agctgcgccc cagcagcccc 960  
 tacggtgtcc cctcgtcgcc cgccgcctcg cagagcctcc ctggcccccga gccctctctc 1020  
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 cccccacca tgagggtgct ggcagggaac ggaccagct ccgacctatc cagggggagc 1140  
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 gctcagttct gactgaggcc ccagctccgt ggagcaccag acacgagcac tgcccctggc 1260  
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 ctgctctttc tagaccggag tggtcagccc ccgaagccgg ggaggggggc tctccccagc 1560  
 ccagagcagc acagccctca gactggaaga tgctttaatt tttaaaatta aaaaataata 1620  
 cgaactgtgc ttccatttcc cagcttcttc tgtctagttc tgcc 1664

<210> 16  
 <211> 403  
 <212> PRT  
 <213> Sus scrofa

<400> 16  
 Met Glu Ala Arg Gly Glu Leu Gly Pro Ser Arg Glu Ser Ala Gly Gly  
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 Asp Leu Leu Leu Ala Leu Leu Ala Arg Arg Glu Asp Leu Arg Arg Glu  
 20 25 30  
 Ile Pro Leu Cys Ala Gly Cys Asp Gln His Ile Leu Asp Arg Phe Ile  
 35 40 45  
 Leu Lys Ala Leu Asp Arg His Trp His Ser Lys Cys Leu Lys Cys Ser  
 50 55 60  
 Asp Cys His Thr Pro Leu Ala Glu Arg Cys Phe Ser Arg Gly Glu Ser



65	70	75	80
Leu Tyr Cys Lys Asp Asp Phe Phe Lys Arg Phe Gly Thr Lys Cys Ala	85	90	95
Ala Cys Gln Leu Gly Ile Pro Pro Thr Gln Val Val Arg Arg Ala Gln	100	105	110
Asp Phe Val Tyr His Leu His Cys Phe Ala Cys Val Val Cys Lys Arg	115	120	125
Gln Leu Ala Thr Gly Asp Glu Phe Tyr Leu Met Glu Asp Ser Arg Leu	130	135	140
Val Cys Lys Ala Asp Tyr Glu Thr Ala Lys Gln Arg Glu Ala Glu Ala	145	150	155
Thr Ala Lys Arg Pro Arg Thr Thr Ile Thr Ala Lys Gln Leu Glu Thr	165	170	175
Leu Lys Ser Ala Tyr Asn Thr Ser Pro Lys Pro Ala Arg His Val Arg	180	185	190
Glu Gln Leu Ser Ser Glu Thr Gly Leu Asp Met Arg Val Val Gln Val	195	200	205
Trp Phe Gln Asn Arg Arg Ala Lys Glu Lys Arg Leu Lys Lys Asp Ala	210	215	220
Gly Arg Gln Arg Trp Gly Gln Tyr Phe Arg Asn Met Lys Arg Ala Arg	225	230	235
Gly Gly Ser Lys Ser Asp Lys Asp Ser Val Gln Glu Glu Gly Gln Asp	245	250	255
Ser Asp Ala Glu Val Ser Phe Thr Asp Glu Pro Ser Met Ala Glu Met	260	265	270
Gly Pro Ala Asn Gly Leu Tyr Gly Gly Leu Gly Glu Pro Ala Pro Ala	275	280	285
Leu Gly Arg Pro Ser Gly Ala Pro Gly Ser Phe Pro Leu Glu His Gly	290	295	300
Gly Leu Ala Gly Pro Glu Gln Tyr Gly Glu Leu Arg Pro Ser Ser Pro	305	310	315
Tyr Gly Val Pro Ser Ser Pro Ala Ala Leu Gln Ser Leu Pro Gly Pro	325	330	335
Gln Pro Leu Leu Ser Ser Leu Val Tyr Pro Glu Ala Gly Leu Gly Leu	340	345	350
Val Pro Ala Gly Pro Pro Gly Gly Pro Pro Pro Met Arg Val Leu Ala	355	360	365
Gly Asn Gly Pro Ser Ser Asp Leu Ser Thr Gly Ser Ser Gly Gly Tyr			

370

375

380

Pro Asp Phe Pro Ala Ser Pro Ala Ser Trp Leu Asp Glu Val Asp His  
 385 390 395 400

Ala Gln Phe

<210> 17

<400> 17

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<210> 18

<400> 18

000

<210> 19

<211> 440

<212> PRT

<213> Drosophila melanogaster

<400> 19

Met Glu Leu Leu Lys Leu Met Met Phe Lys Ser Asp Phe Leu Ser Asn  
 1 5 10 15

Gly Lys Cys Asp Asp Arg Val Pro Pro Ile Asn Leu Ser Gln Leu Pro  
 20 25 30

Glu Phe Leu Leu Ser Thr Ile Pro Lys Cys Gly Gly Cys His Glu Leu  
 35 40 45

Ile Leu Asp Arg Phe Ile Leu Lys Val Leu Glu Arg Thr Trp His Ala  
 50 55 60

Lys Cys Leu Gln Cys Ser Glu Cys His Gly Gln Leu Asn Asp Lys Cys  
 65 70 75 80

Phe Ala Arg Asn Gly Gln Leu Phe Cys Lys Glu Asp Phe Phe Lys Arg  
 85 90 95

Tyr Gly Thr Lys Cys Ser Ala Cys Asp Met Gly Ile Pro Pro Thr Gln  
 100 105 110

Val Val Arg Arg Ala Gln Asp Asn Val Tyr His Leu Gln Cys Phe Leu  
 115 120 125

Cys Ala Met Cys Ser Arg Thr Leu Asn Thr Gly Asp Glu Phe Tyr Leu  
 130 135 140

Met Glu Asp Arg Lys Leu Ile Cys Lys Arg Asp Tyr Glu Glu Ala Lys  
 145 150 155 160

Ala Lys Gly Leu Tyr Leu Asp Gly Ser Leu Asp Gly Asp Gln Pro Asn  
 165 170 175

Lys Arg Pro Arg Thr Thr Ile Thr Ala Lys Gln Leu Glu Thr Leu Lys  
 180 185 190  
 Thr Ala Tyr Asn Asn Ser Pro Lys Pro Ala Arg His Val Arg Glu Gln  
 195 200 205  
 Leu Ser Gln Asp Thr Gly Leu Asp Met Arg Val Val Gln Val Trp Phe  
 210 215 220  
 Gln Asn Arg Arg Ala Lys Glu Lys Arg Leu Lys Lys Asp Ala Gly Arg  
 225 230 235 240  
 Thr Arg Trp Ser Gln Tyr Phe Arg Ser Met Lys Gly Asn Cys Ser Pro  
 245 250 255  
 Arg Thr Asp Lys Phe Leu Asp Lys Asp Glu Leu Lys Val Asp Tyr Asp  
 260 265 270  
 Ser Phe Ser His His Asp Leu Ser Asn Asp Ser Tyr Ser Thr Val Asn  
 275 280 285  
 Leu Gly Leu Asp Glu Gly Ala Ser Pro His Ser Ile Arg Gly Ser Tyr  
 290 295 300  
 Met His Gly Ser Ser Ser Pro Ser Gln Tyr Pro Pro Ser Ser Arg Ser  
 305 310 315 320  
 Pro Pro Pro Val Gly Gln Gly His Thr Phe Gly Ser Tyr Pro Asp Asn  
 325 330 335  
 Ile Val Tyr Thr Asn Ile Asp Gln Ala Val Gly Ser Ser Leu His Ala  
 340 345 350  
 Ser Lys Ala His His Arg Leu His Ser Ser Asn Asn Val Ser Asp Leu  
 355 360 365  
 Ser Asn Asp Ser Ser Pro Asp Gln Gly Tyr Pro Asp Phe Pro Pro Ser  
 370 375 380  
 Pro Asp Ser Trp Leu Gly Asp Ser Gly Ser Thr Asn Thr Thr Ser Ala  
 385 390 395 400  
 Asn Asn Asn Ala Asn Asn Asn Ser Ser Arg Ser His Asn Asn Asn Asn  
 405 410 415  
 Ser Ser Gly Gly Gly Ser Gly Gly Val Ser Val Ser Thr Ala Pro Asn  
 420 425 430  
 Pro Ser Ala Pro Gly Val His Tyr  
 435 440

<210> 20

<211> 367

<212> PRT

<213> Mus musculus

<400> 20

Met Gln Gln Ile Pro Gln Cys Ala Gly Cys Asn Gln His Ile Leu Asp  
1 5 10 15

Lys Phe Ile Leu Lys Val Leu Asp Arg His Trp His Ser Ser Cys Leu  
20 25 30

Lys Cys Ala Asp Cys Gln Met Gln Leu Ala Asp Arg Cys Phe Ser Arg  
35 40 45

Ala Gly Ser Val Tyr Cys Lys Glu Asp Phe Phe Lys Arg Phe Gly Thr  
50 55 60

Lys Cys Thr Ala Cys Gln Gln Gly Ile Pro Pro Thr Gln Val Val Arg  
65 70 75 80

Lys Ala Gln Asp Phe Val Tyr His Leu His Cys Phe Ala Cys Ile Ile  
85 90 95

Cys Asn Arg Gln Leu Ala Thr Gly Asp Glu Phe Tyr Leu Met Glu Asp  
100 105 110

Gly Arg Leu Val Cys Lys Glu Asp Tyr Glu Thr Ala Lys Gln Asn Asp  
115 120 125

Asp Ser Glu Ala Gly Ala Lys Arg Pro Arg Thr Thr Ile Thr Ala Lys  
130 135 140

Gln Leu Glu Thr Leu Lys Asn Ala Tyr Lys Asn Ser Pro Lys Pro Ala  
145 150 155 160

Arg His Val Arg Glu Gln Leu Ser Ser Glu Thr Gly Leu Asp Met Arg  
165 170 175

Val Val Gln Val Trp Phe Gln Asn Arg Arg Ala Lys Glu Lys Arg Leu  
180 185 190

Lys Lys Asp Ala Gly Arg His Arg Trp Gly Gln Phe Tyr Lys Ser Val  
195 200 205

Lys Arg Ser Arg Gly Gly Ser Lys Gln Glu Lys Glu Ser Ser Ala Glu  
210 215 220

Asp Cys Gly Val Ser Asp Ser Glu Leu Ser Phe Arg Glu Asp Gln Ile  
225 230 235 240

Leu Ser Glu Leu Gly His Thr Asn Arg Ile Tyr Gly Asn Val Gly Asp  
245 250 255

Val Thr Gly Gly Gln Leu Met Asn Gly Ser Phe Ser Met Asp Gly Thr  
260 265 270

Gly Gln Ser Tyr Gln Asp Leu Arg Asp Gly Ser Pro Tyr Gly Ile Pro  
275 280 285

Gln Ser Pro Ser Ser Ile Ser Ser Leu Pro Ser His Ala Pro Leu Leu

290 295 300

Asn Gly Leu Asp Tyr Thr Val Asp Ser Asn Leu Gly Ile Ile Ala His  
 305 310 315 320

Ala Gly Gln Gly Val Ser Gln Thr Leu Arg Ala Met Ala Gly Gly Pro  
 325 330 335

Thr Ser Asp Leu Ser Thr Gly Ser Ser Val Gly Tyr Pro Asp Phe Pro  
 340 345 350

Thr Ser Pro Ala Ser Trp Leu Asp Glu Met Asp His Pro Pro Phe  
 355 360 365

<210> 21  
 <211> 402  
 <212> PRT  
 <213> Mus musculus

<400> 21

Met Glu Ala Arg Gly Glu Leu Gly Pro Ala Arg Glu Ser Ala Gly Gly  
 1 5 10 15

Asp Leu Leu Leu Ala Leu Leu Ala Arg Arg Ala Asp Leu Arg Arg Glu  
 20 25 30

Ile Pro Met Cys Ala Gly Cys Asp Gln His Ile Leu Asp Arg Phe Ile  
 35 40 45

Leu Lys Ala Leu Asp Arg His Trp His Ser Lys Cys Leu Lys Cys Ser  
 50 55 60

Asp Cys His Val Pro Leu Ala Glu Arg Cys Phe Ser Arg Gly Glu Ser  
 65 70 75 80

Val Tyr Cys Lys Asp Asp Phe Phe Lys Arg Phe Gly Thr Lys Cys Ala  
 85 90 95

Ala Cys Gln Leu Gly Ile Pro Pro Thr Gln Val Val Arg Arg Ala Gln  
 100 105 110

Asp Phe Val Tyr His Leu His Cys Phe Ala Cys Val Val Cys Lys Arg  
 115 120 125

Gln Leu Ala Thr Gly Asp Glu Phe Tyr Leu Met Glu Asp Ser Arg Leu  
 130 135 140

Val Cys Lys Ala Asp Tyr Glu Thr Ala Lys Gln Arg Glu Ala Glu Ala  
 145 150 155 160

Thr Ala Lys Arg Pro Arg Thr Thr Ile Thr Ala Lys Gln Leu Glu Thr  
 165 170 175

Leu Lys Ser Ala Tyr Asn Thr Ser Pro Lys Pro Ala Arg His Val Arg  
 180 185 190

Glu Gln Leu Ser Ser Glu Thr Gly Leu Asp Met Arg Val Val Gln Val  
 195 200 205  
 Trp Phe Gln Asn Arg Arg Ala Lys Glu Lys Arg Leu Lys Lys Asp Ala  
 210 215 220  
 Gly Arg Gln Arg Trp Gly Gln Tyr Phe Arg Asn Met Lys Arg Ser Arg  
 225 230 235 240  
 Gly Ser Ser Lys Ser Asp Lys Asp Ser Ile Gln Glu Gly Gln Asp Ser  
 245 250 255  
 Asp Ala Glu Val Ser Phe Thr Asp Glu Pro Ser Met Ala Asp Met Gly  
 260 265 270  
 Pro Ala Asn Gly Leu Tyr Ser Ser Leu Gly Glu Pro Ala Pro Ala Leu  
 275 280 285  
 Gly Arg Pro Val Gly Gly Leu Gly Ser Phe Thr Leu Asp His Gly Gly  
 290 295 300  
 Leu Thr Gly Pro Glu Gln Tyr Arg Glu Leu Arg Pro Gly Ser Pro Tyr  
 305 310 315 320  
 Gly Ile Pro Pro Ser Pro Ala Ala Pro Gln Ser Leu Pro Gly Pro Gln  
 325 330 335  
 Pro Leu Leu Ser Ser Leu Val Tyr Pro Asp Thr Asn Leu Ser Leu Val  
 340 345 350  
 Pro Ser Gly Pro Pro Gly Gly Pro Pro Pro Met Arg Val Leu Ala Gly  
 355 360 365  
 Asn Gly Pro Ser Ser Asp Leu Ser Thr Glu Ser Ser Ser Gly Tyr Pro  
 370 375 380  
 Asp Phe Pro Ala Ser Pro Ala Ser Trp Leu Asp Glu Val Asp His Ala  
 385 390 395 400  
 Gln Phe

<210> 22

<211> 8867

<212> DNA

<213> Homo sapiens

<400> 22

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 ggctcgagcg cgaccgagcg agggccgggg ccgccgcgt ctgcaccttg ggcgggactc 180  
 ggggtaagcc ccagcaggac actgaggaca gaaacggcaa gggcggcaga ggcgcgagga 240  
 aggggggtgcg tgcaggggcca gcggccaggc aaagaaagtc ccgccgctct gcaggcggga 300  
 cacagagatg gaaactgcag agagtgagtt tccagatccc aggggtggcgg ggagggcctg 360  
 acgctggcct gcaagagtgc gggacagcgg ttggagtggg gggccctaga aaaaaagggg 420  
 gcatcgcagg cacagctggg gggcgatggg gccgaccaag ggggtgctagg ttcccccggt 480

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ggacccaagc	cttgtgtctc	ccgcctgaac	caccctcccc	aagggccatt	ccatcaccac	600
ggacgctggg	aaataatgga	ggcattgttg	gagggctggc	cagatgccag	caggggtgggc	660
cgctcctta	acctggcgcc	gccccttccc	cagtcctgcc	acacacgacc	cctgatcgct	720
tcggcagcag	ctgacactca	gccacctgca	cccagcacag	cccgcacaca	ctcggctttg	780
caccgcgctg	tccttgccct	ggcccttctt	gggtaacaag	tgctgtgcaa	agtgaagggg	840
cagaaaactg	gctgcatggg	ccactgctca	aaacggacac	atcggacctg	ctgggagcta	900
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agtccagaag	ccataggcag	agtggacaga	gtattgctgt	gagaccaca	gggagaggga	1020
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cagggcaccc	ctgctttgcc	aagtccctgtg	ctgccgaggg	ccaccactg	ctgtgttctt	1140
ccccgggtgg	ctgcccaggg	ctgggtgctg	cccaggggcc	tctgggcagg	ggtgggtgcg	1200
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<211> 182

<212> DNA

<213> Homo sapiens

<400> 23

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<211> 212

<212> DNA

<213> Homo sapiens

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<210> 26

<211> 2540

<212> DNA

<213> Homo sapiens

<400> 26

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<211> 2070
<212> DNA
<213> Homo sapiens
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<210> 28

<211> 26

<212> PRT

<213> Homo sapiens

<400> 28

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<210> 29

<211> 31

<212> PRT

<213> Homo sapiens

<400> 29

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<400> 30

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<211> 29  
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<210> 33  
<211> 31  
<212> PRT  
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<400> 33  
Met Glu Ala Arg Gly Glu Leu Gly Pro Ser Arg Glu Ser Ala Gly Gly  
1 5 10 15  
Asp Leu Leu Leu Ala Leu Leu Ala Arg Arg Glu Asp Leu Arg Arg  
20 25 30

<210> 34  
<211> 22  
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<220>  
<223> Description of Artificial Sequence: PCR primer

<400> 34  
atgctgctgg aaacggggct cg 22

<210> 35  
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<220>  
<223> Description of Artificial Sequence: PCR primer

<400> 35  
ccgagtcctcg cccaaggtgc 20

<210> 36  
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<220>

<223> Description of Artificial Sequence: PCR primer

<400> 36

atggaggcgc gcggggagct

20

<210> 37

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 37

ctcggcgcag gtctgccctc

20

<210> 38

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 38

gcgaccgagc gaggcccggg gccgc

25

<210> 39

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Probe

<400> 39

cccggcccgg gagtcggcgg gaggc

25

<210> 40

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Probe

<400> 40

ttccccgatg agccttcctt ggcggaa

27

<210> 41  
<211> 20  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 41  
ggcacgagcc ccgcacgacg 20

<210> 42  
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<212> DNA  
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<220>  
<223> Description of Artificial Sequence:alpha-GSU  
sequence

<400> 42  
gatccggtac ttagctaatt aaatga 26

<210> 43  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Lhx3 consensus  
binding sequence

<400> 43  
gatcccagaa aattaattaa ttgtaa 26

<210> 44  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 44  
ggcacgagcc ccgcacgacg 20

<210> 45  
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<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 45  
tttgaagtct tggaaagtgc 20

<210> 46  
<211> 21  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 46  
tgacctcgga ggagcgcgctc t 21

<210> 47  
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<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 47  
tcgtccttgc agtaaacgct 20

<210> 48  
<211> 20  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 48  
agcgtttact gcaaggacga 20

<210> 49  
<211> 20  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 49  
cgcacttggt cccgaagcgc 20

<210> 50  
<211> 20  
<212> DNA  
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<220>  
 <223> Description of Artificial Sequence:PCR primer

<400> 50  
 gcgcttcggg accaagtgcg 20

<210> 51  
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<220>  
 <223> Description of Artificial Sequence:PCR primer

<400> 51  
 cggggaagga gacctcagcg t 21

<210> 52  
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 <212> DNA  
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<220>  
 <223> Description of Artificial Sequence:PCR primer

<400> 52  
 ggacaaggac agcgttcag 19

<210> 53  
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 <212> DNA  
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<220>  
 <223> Description of Artificial Sequence:PCR primer

<400> 53  
 ctcccgtaga ggccattg 18

<210> 54  
 <211> 41  
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<220>  
 <223> Description of Artificial Sequence:PCR primer

<400> 54  
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<210> 55

<211> 33  
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 <223> Description of Artificial Sequence:PCR primer  
  
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 cgggatccaa gcagcgagag gccgaggcca cgg 33

<210> 56  
 <211> 75  
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 <223> Description of Artificial Sequence:PCR primer  
  
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 cacaggagct gggag 75

<210> 57  
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 <400> 57  
 caattaaccc tcactaaagg g 21

<210> 58  
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 <212> DNA  
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 <223> Description of Artificial Sequence:PCR primer  
  
 <400> 58  
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<210> 59  
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ccgctcgagg gatattagct tgtcttgcca tttc 34

<210> 60

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 60

cgggatcctg ggaggggcgg ccacaggagc tg 32

<210> 61

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 61

cggaattcag tcagaactga gcgtgatcc 29

<210> 62

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 62

cgggatccaa gcagcgagag gccgaggcca cgg 33

<210> 63

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 63

cggaattcag tcagaactga gcgtgatcc 29

<210> 64

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 64

acattaggta cttagctaat taaatgtg

28

<210> 65

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 65

cacatttaat tagctaagta cctaattg

28

<210> 66

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 66

acattaggta cttggcgcg ccaatgtg

28

<210> 67

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 67

cacatttggc gcgccaagta cctaattg

28

<210> 68

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 68

cgggatccat gctggatcgg gatgtgggcc caac

34

<210> 69

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 69

cggaattccg tcttctgctc cctggagctg tg

32

<210> 70

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 70

cggaattcta caacacctcg cccaagccgg

30

<210> 71

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 71

cggaattcgg aacgaggggc ccttgac

27

<210> 72

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 72

gatccaaaag gaaatgagag a

21

<210> 73

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 73

cagtcaggt ggtacacgaa gtcct

25

<210> 74  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 74  
cagtgcaggt ggtacacgaa gtcct

25

<210> 75  
<211> 19  
<212> DNA  
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<220>

<223> Description of Artificial Sequence:PCR primer

<400> 75  
ggacaaggac agcgttcag

19

<210> 76  
<211> 18  
<212> DNA  
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<220>

<223> Description of Artificial Sequence:PCR primer

<400> 76  
ctcccgtaga ggccattg

18

<210> 77  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Probe

<400> 77  
ttccccgatg agccttcctt ggcggaa

27

<210> 78  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 78

cggaattcta caacacctcg cccaagccgg 30

<210> 79

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 79

cggaattcgg aacgaggggc ccttgac 27

<210> 80

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 80

cgggatccga tcgcttcggc agcagctg 28

<210> 81

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 81

cgggatcctt gatatttacc ccggaggc 28

<210> 82

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 82

gcgaagcttg gaactgagcg tggcttacct ca 32

<210> 83

<211> 29

<212> DNA

<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 83  
tacaagcttc gcgatgctgc tggaaacgg 29

<210> 84  
<211> 29  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 84  
tacaagctta ccatggaggc gcgcgggga 29

<210> 85  
<211> 29  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 85  
cccggtagca actgagcgtg gtctacctc 29

<210> 86  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 86  
ggacaaggac agcgttcag 19

<210> 87  
<211> 18  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 87  
ctcccgtaga ggccattg 18

<210> 88  
<211> 28



<212> DNA  
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 <223> Description of Artificial Sequence:PCR primer  
  
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 <210> 89  
 <211> 28  
 <212> DNA  
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 <223> Description of Artificial Sequence:PCR primer  
  
 <400> 89  
 cgggatccat ggaggcgcgc ggggagct 28  
  
 <210> 90  
 <211> 28  
 <212> DNA  
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 <220>  
 <223> Description of Artificial Sequence:PCR primer  
  
 <400> 90  
 cggaattctc agaactgagc gtggtcta 28  
  
 <210> 91  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:PCR primer  
  
 <400> 91  
 tggtcacagc ctgcacacat 20  
  
 <210> 92  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:PCR primer  
  
 <400> 92  
 aaccactgga ttagtgactg 20

<210> 93  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 93  
gaagttcagg gtcggaggg

19

<210> 94  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 94  
tggtcacagc ctgcacacat

20

<210> 95  
<211> 21  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 95  
cagaaaatta attaattgta a

21

<210> 96  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 96  
cgggatccat gctgctggaa acggggct

28

<210> 97  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 97  
cggaattctc agaactgagc gtggtcta 28

<210> 98  
<211> 28  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 98  
cgggatccat ggaggcgcgc ggggagct 28

<210> 99  
<211> 28  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 99  
cggaattctc agaactgagc gtggtcta 28

<210> 100  
<211> 28  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 100  
acattagga cttagcta taaatgtg 28

<210> 101  
<211> 28  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 101  
cacattta tagctaagta cctaatgt 28

<210> 102  
<211> 192  
<212> DNA  
<213> Homo sapiens

<400> 102  
tcttccggga gagggcccct cctctcccca gaccacaggg ggctctctctg cctccagccc 60  
caccttcccc gggagaagct ttccccaatc cccagggtctc tagatcattc tgttctcgag 120  
tattctgtgg agggaggcaaa aatgcctggc gcccttctc tccaagctca attctctaag 180  
ccctcaggg tc 192

<210> 103  
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<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 103  
caaccgtgt cccgcactct t 21

<210> 104  
<211> 21  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 104  
gaaagtccgg gactggagag t 21

<210> 105  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 105  
cagtgccaca acctcactca 20

<210> 106  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 106  
tacgaggtga cccagaactt 20

<210> 107  
<211> 20

<212> DNA  
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<220>

<223> Description of Artificial Sequence:PCR primer

<400> 107

cctggccttg gtgattgtga

20

<210> 108

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 108

tttcagacca ggaaaggtgg

20

<210> 109

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 109

cgaaatgagc ctgcgccttc

20

<210> 110

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 110

gctgccgcgc ctcaccgct

19

<210> 111

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 111

aggagtccac taactccatg

20

<210> 112  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 112  
cgctgactga gcctctgctt 20

<210> 113  
<211> 20  
<212> DNA  
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<220>  
<223> Description of Artificial Sequence:PCR primer

<400> 113  
cctcgtgtga ggtgcagggt 20